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Docket No. F-6560

Ser. No. 09/594,389

REMARKS

Claims 1, 4-9, 11-16, 18, 19 and 21-33 remain in this application. Claims 1, 4-9, 11-16, 18, 19, 21-33 are rejected. Claims 2, 3, 10, 17 and 20 are previously cancelled.

Claims 1 and 9 are amended herein to address matters of form unrelated to substantive patentability issues. Specifically, in claims 1 and 9, the term "thereof" relating to the outer circumference of the operation member has been changed to expressly recite that the detection units are arranged around the outer circumference "of said operation member". Also, in claim 1, the term "thereof" relating to the central side of the electrode plates has been changed to expressly recite that the protrusion is shifted from both longitudinal ends of the electrode plates into "a central side of said electrode plates".

Claims 1, 9, 14 and 28 are also amended to clarify the claims. No new issues are believed to be raised by the amendments to the claims.

Claims 1, 4, 6-8, 11-16, 19, 21-25, 28-30, 31 and 33, are rejected under 35 U.S.C. §103(a) as being unpatentable over Burgess (U.S. Pat. No. 5,695,859) or Burgess (U.S. Pat. No. 5,828,289) in view of Burgess (U.S. Pat. No. 6,114,645).

The Examiner's rejection is respectfully traversed.

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With respect to claims 1, 4, 6-8, 11-13 and 31, the Burgess references do not disclose all of the features set forth in independent claim 1. With respect to claims 14-16, 19 and 21-25, the Burgess references do not disclose all of the features set forth in independent claim 14.

Claim 1 includes the features of elongate detection units arranged such that the operation member is supported at a plurality of points around an outer circumference of the operation member with a space being formed under a center of the operation member and with each detection unit including a sensing element and a coating member coating the sensing element and contacting the operation member. Moreover, claim 1 recites that the coating member includes a protrusion for limiting a position to which the load toward the sensing element is transmitted and is shifted from both longitudinal ends of elongate electrode plates of the sensing element into a central side of the electrode plates. In a similar manner, claim 14 recites that the coating member includes a protrusion for limiting a position to which the load toward the sensing element is transmitted and is spaced from both longitudinal ends of the electrode plates of the sensing element.

An advantage of supporting the operation member around its outer circumference is that the space can be formed between the detection units and below a central portion of the operation member. Since it is not supported by detection units, the center of the operation member can bend downward easily

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when a load is applied thereto and this load is steadily applied toward the circumference of the operation members where the detection units are arranged. In addition, a highly realistic bending feeling is imparted to the player standing on the operation member.

An advantage of the protrusion being shifted or spaced from both longitudinal ends of elongate electrode plates of the sensing element (into a central side of the electrode plates) is that the load on the operation member can be concentrated toward the central side or center of the electrode plates irrespective of the portion of the detection unit where the load is applied. By spacing the protrusions from the longitudinal ends of the electrode plates, the sensitivity of the longitudinal ends of the detection unit does not decrease in comparison to the sensitivity of the detection units at locations where the protrusion is present.

None of the Burgess patents disclose these features.

As to the feature of the detection units arranged such that an operation member is supported at a plurality of points around the outer circumference thereof to form a space under the center of the operation member, the Examiner points to Fig. 11 of the Burgess '859 or '259 references and states that the frame cover plate 127 is supported at a plurality of points around an outer circumference thereof.

Fig. 11 of the Burgess '859 and '259 references shows a pressure actuated switch 120 including a cover plate 127 arranged opposite a bottom plate 121 with a

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cover sheet 126, a foam layer 125 and a spacer element 123 therebetween. The spacer element 123 includes a top conductive layer 124. Electrodes 122 extend through apertures in the spacer element 123.

The embodiment shown in Fig. 11 of Burgess '859 and '259 does not include any type of detection units which include a sensing element and a coating member which coats the sensing element and contacts and support an operation member. That is, there are no detection units which support the cover plate 127 around its outer circumference, i.e., the rectangular edge. Indeed, there is no structure whatsoever shown in Fig. 11 to support the cover plate other than the cover sheet, foam 125 and spacer element 123 which are arranged in the center of the cover plate 127, and not around an outer circumference of the cover plate 127.

In view of the presence of the structure in the center of cover plate, there is no space formed below the center of the operation member between the detection units.

The Examiner notes the presence of detection units in the embodiments of Figs. 12, 13, 15 and 16. However, these embodiments are mat switches which are significantly different than the embodiment shown in Fig. 11 with respect to the manner in which an operation member is supported.

Thus, the feature of the specifically claimed detection units arranged such that the operation member is supported at a plurality of points around its outer circumference is not disclosed in any of the Burgess references.

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As to the feature of the location of the protrusion, the Examiner takes a position that this is design choice since it does not bring unexpected results in sensing a desired point of contact (see the Office Action, page 8).

This position is traversed because there is at least one unexpected advantage in the positioning of the protrusion of the coating member in the invention. Specifically, by spacing the protrusions away from the longitudinal ends of the elongate electrode plates, the load applied to the operation member is concentrated in the central side of the electrode plates. Moreover, the absence of protrusions at the longitudinal ends causes the restoring force of elasticity at the longitudinal ends to be stronger than at the central side of the coating member. These results are entirely unexpected especially in view of the fact that the Burgess references show protrusions 131e extending the entire length of the mat switch and do not mention varying this arrangement.

In addition, the mat switch 130 of the Burgess references, and thus the electrode plates therein, is not elongate and cannot have protrusions spaced or shifted from longitudinal ends.

In sum, the combination of protrusions on coating members of detection units which coat sensing elements and the arrangement of the detection units around an outer circumference of an operation member to support the operation member provides unique and unobvious advantages relative to the mat switches and pressure

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actuated switches of the Burgess references. The Burgess references simply do not disclose, teach or suggest detection units arranged around an outer circumference of an operation member to form a space under a center of an operation member and therefore cannot even remotely suggest the advantages of arranging protrusions on a coating member of the detection units shifted or spaced from longitudinal ends of the coating member to affect the loading and sensitivity of the sensing element of the detection units.

Moreover, with respect to claims 7 and 8, the Burgess references do not disclose a stopper located closer to a center of the operation member than the detection units, as discussed more fully below.

In view of the arguments presented above, it is respectfully submitted that one skilled in the art could not combine the Burgess references and arrive at the embodiments of the invention set forth in claims 1, 4, 6-8, 11-16, 19, 21-25 and 31.

With respect to claims 28-30 and 33, the Burgess references do not disclose all of the features set forth in independent claim 28.

Claim 28 recites a stopper for limiting displacement of an operation member in relation to a predetermined direction in a certain range and that the stopper is located closer to a center of an operation member than a detection unit. By positioning the stopper closer to the center of the operation member which bends

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when a load is applied thereto, the stopper is thus arranged between the area which bends when a load is applied and the sensing element of the detection unit. As such, the stopper can adapt the load to the operation member to prevent an excessive load from being applied to the detection unit.

Claim 28 also recites that the coating member is arranged to contact an outer circumference of the operation member.

None of the Burgess patents disclose these features.

The Examiner pointed to the struts 137 in the Burgess '859 and '289 references to constitute stoppers. The struts 137 are arranged outward from the sensing elements 132 in relation to the operation member, i.e., the sensing elements 132 are between the struts 137 and the center of the operation member.

Thus, in contrast to the invention, the struts 137 in the Burgess '859 and '289 references are not located closer to a center of an operation member than a detection unit. As such, the struts 137 cannot prevent an excessive load from being applied to the sensing elements 132.

Moreover, with respect to claim 33, the Examiner's position that the arrangement of the stopper external of the detection unit such that the operation member is in contact with the stopper upon application of a load is an alternative design choice and conventional application is respectfully traversed. The mat switch 131 of the Burgess references cannot be modified to provide the struts 137

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external thereof since the struts 137 provide support for the mat switch and divide the piezoresistive layer 136 into sections (see col. 10, lines 45-48). Since the piezoresistive layer 136 is inherently inside the sealed housing 131 of the mat switch 130, it is equally inherent that the struts 137 must be inside the sealed housing 131 in order to divide the piezoresistive layer 136.

Thus, it is certainly not an alternative design choice or conventional application to provide a stopper external of a detection unit and in contact with an operation member as suggested by the Examiner.

In view of the arguments presented above, it is respectfully submitted that the rejection of claims 28-30 and 33 under 35 U.S.C. §103(a) as being unpatentable over Burgess '859 or Burgess '289 in view of Burgess '645 has been overcome and should be removed.

Claims 5 and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Burgess '859 or '289 and Burgess '645 and further in view of Saur et al. (U.S. Pat. No. 6,110,073). Claim 26 is rejected under 35 U.S.C. §103(a) as being unpatentable over Burgess '859 or '289 and Burgess '645 and further in view of applicant's admitted prior art.

Saur et al. and the applicant's admitted prior art do not overcome the deficiencies of the rejections of claims 1 and 14 as discussed above, and upon which claims 5, 18 and 26 depend, and therefore, one skilled in the art could not

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have modified the Burgess references as suggested by the Examiner to arrive at the embodiments set forth in these claims.

Claims 9, 27 and 32 are rejected under 35 U.S.C. §103(a) as being unpatentable over Burgess '859 or '289 in view of Hector et al. (U.S. Pat. No. 4,720,789).

The Examiner's rejection is respectfully traversed on the grounds that the Burgess references and the Hector et al. reference do not disclose all of the features set forth in independent claim 9.

Claim 9 recites a plurality of detection units such that an operation member is supported at a plurality of points around an outer circumference of the operation member such that a space is formed under a center of the operation member, a plurality of stoppers for limiting an amount of pushing operation toward an operation member and that the stoppers are arranged inward compared to a plurality of detection units.

As discussed above, the Burgess references do not disclose an operation member supported at a plurality of points around its outer circumference by detection units to form a space below a center of the operation member. Hector et al. also do not disclose this type of support for an operation member.

Regarding the stoppers, the Examiner pointed to the struts 137 in the Burgess '859 and '289 references to constitute stoppers. As argued above, the struts 137 in

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the Burgess references are not located closer to a center of an operation member than a detection unit. As such, the struts 137 cannot prevent an excessive load from being applied to the sensing elements 132.

Moreover, with respect to claim 32, the Examiner's position that the arrangement of the stopper external of the detection unit is an alternative design choice and conventional application is respectfully traversed. As argued above, the mat switch 131 of the Burgess references cannot be modified to provide the struts 137 external thereof since the struts 137 divide the piezoresistive layer 136 into sections and thus must be located inside the sealed housing 131 of the mat switch along with the piezoresistive layer 136. Thus, it is not an alternative design choice or conventional application to provide a stopper external of a detection unit and arranged to contact an operation member as suggested by the Examiner.

In view of the foregoing, it is respectfully submitted that the rejection of claims 9, 27 and 32 under 35 U.S.C. §103(a) as being unpatentable over Burgess '859 or '289 in view of Hector et al. has been overcome and should be removed.


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In light of the foregoing, the application is now believed to be in proper form for allowance of all claims and notice to that effect is earnestly solicited. Please charge any deficiency or credit any overpayment to Deposit Account No. 10-1250.

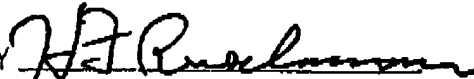
Respectfully submitted,

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